

WHAT IS CLAIMED IS:

1. An isolated nucleic acid sequence encoding a microtubule motor protein, wherein the motor protein has the following properties: (i) the protein's activity includes microtubule stimulated ATPase activity; and (ii) the protein has a sequence that has greater than 70% amino acid sequence identity to SEQ ID NO:2 or SEQ ID NO:4 as measured using a sequence comparison algorithm.
2. An isolated nucleic acid sequence of claim 1, wherein the protein specifically binds to polyclonal antibodies to a protein comprising SEQ ID NO:2 or SEQ ID NO:4.
3. An isolated nucleic acid sequence of claim 1, wherein the nucleic acid encodes SEQ ID NO:2 or SEQ ID NO:4.
4. An isolated nucleic acid sequence of claim 1, wherein the nucleic acid has a nucleotide sequence of SEQ ID NO:1 or SEQ ID NO:3.
5. An isolated nucleic acid sequence of claim 1, wherein the nucleic acid selectively hybridizes under stringent hybridization conditions to SEQ ID NO:1 or SEQ ID NO:3.
6. An expression vector comprising a nucleic acid encoding a microtubule motor protein, wherein the motor protein has the following properties: (i) the protein's activity includes microtubule stimulated ATPase activity; and (ii) the protein has a sequence that has greater than 70% amino acid sequence identity to SEQ ID NO:2 or SEQ ID NO:4 as measured using a sequence comparison algorithm.
7. A host cell transfected with the vector of claim 6.
8. An isolated microtubule motor protein, wherein the protein has greater than 70% amino acid sequence identity to SEQ ID NO:2 or SEQ ID NO:4 as measured using a sequence comparison algorithm.

9. An isolated protein of claim 8, wherein the protein specifically binds to polyclonal antibodies to HsKip3.

5 10. An isolated protein of claim 8, wherein the protein is HsKip3.

11. An isolated protein of claim 8, wherein the protein has an amino acid sequence of SEQ ID NO:2 or SEQ ID NO:4.

10 12. An isolated protein of claim 8, wherein the protein specifically binds to polyclonal antibodies generated against a motor domain of HsKip3.

13. An isolated protein of claim 8, wherein the protein comprises an amino acid sequence of a HsKip3a motor domain.

15 14. A method for screening for modulators of HsKip3, the method comprising the steps of:

(i) providing biologically active HsKip3, wherein has the following properties:
(i) activity including microtubule stimulated ATPase activity; and (ii) sequence that
20 has greater than 70% amino acid sequence identity to HsKip3a of SEQ ID NO:2 or
SEQ ID NO:4 as measured using a sequence comparison algorithm;

(ii) contacting biologically active HsKip3a with a candidate agent in a test and control concentration; and

(iii) assaying for the level of HsKip3a activity, wherein the HsKip3a activity is
25 selected from the group consisting of binding activity or ATPase activity, and wherein
a change in activity between the test and control concentration indicates a modulator.

15. A method of claim 14, wherein the screening occurs in a multi-well plate as part of a high-throughput screen.

30 16. A method of claim 14, wherein the biologically active HsKip3a comprises an amino acid sequence of a HsKip3a motor domain.

17. A compound that modulates HsKip3, wherein said compound is identified using the method of Claim 14.

18. An isolated nucleic acid comprising a sequence which has
5 greater than 60% sequence identity with nucleotide SEQ ID NO:1 or SEQ ID NO:3.